

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
15 August 2002 (15.08.2002)

PCT

(10) International Publication Number
WO 02/063451 A1

(51) International Patent Classification⁷: G06F 1/16

(74) Agents: NAMAZIE, Farah et al.; Haq & Namazic Partnership, Robinson Road, P.O. Box 765, Singapore 901515 (SG).

(21) International Application Number: PCT/SG01/00034

(22) International Filing Date: 9 February 2001 (09.02.2001)

(25) Filing Language: English

(26) Publication Language: English

(71) Applicant (for all designated States except US): NIXVUE SYSTEMS PTE. LTD. [SG/SG]; 30 Loyang Way #07-02, Singapore 508769 (SG).

(81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

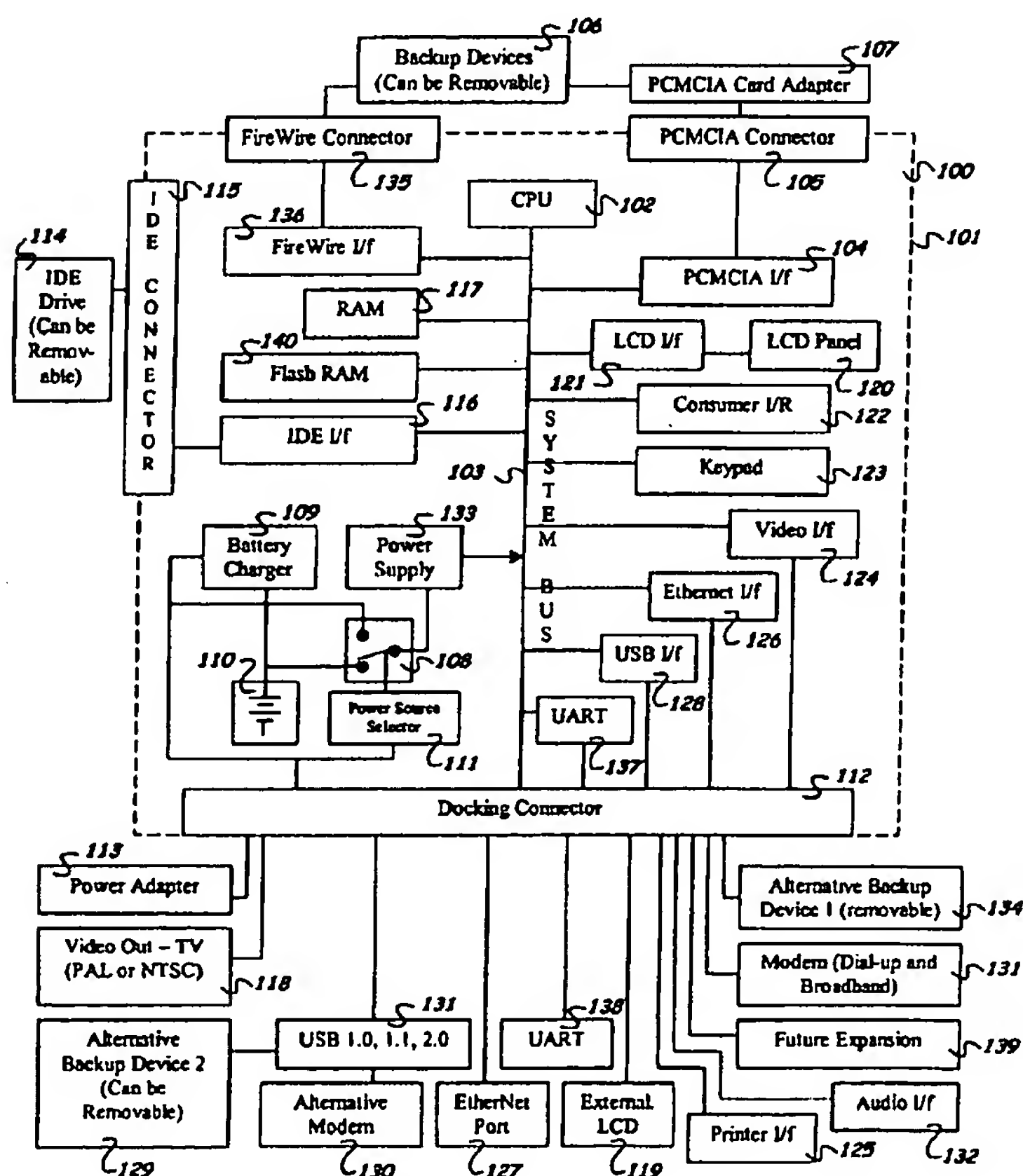
(72) Inventors; and

(75) Inventors/Applicants (for US only): TAN, Kee, Chew [SG/SG]; 287 Tampines St. 22, Unit #08-378, Singapore 520287 (SG). CHUA, Welic [SG/SG]; Woodlands Ring Road, Blk 658 #4-104, Singapore 730658 (SG).

(84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

[Continued on next page]

(54) Title: A PORTABLE STORAGE MEDIUM FOR DIGITAL PICTURE DATA



(57) Abstract: A portable storage medium for digital picture data comprises a storage unit for storing data, a first communication interface being adapted to exchange data with a display, a first encoding unit for encoding stored digital picture data in a first data format which can be processed by the display, a second communication interface being adapted to exchange data with a printer, a second encoding unit for encoding stored digital picture data in a second data format which can be processed by the printer, a third communication interface being adapted to exchange data with another storage device, and a fourth communication interface being adapted to exchange data with a computer.

WO 02/063451 A1



Published:

— with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

A portable storage medium for digital picture dataBACKGROUND OF THE INVENTION

5

The invention relates to a portable storage medium for digital picture data.

10 The century-old photography industry has been revolutionized by the new concept of a digital camera.

A digital camera uses digitized picture data for representing the content of a picture. The picture includes picture points, to which coding information is assigned. Coding
15 information may be luminance information or colour information, for example. Furthermore, picture object information describing picture object characteristics may be assigned to the picture points. Usually, the picture points are grouped into picture blocks, which further may be grouped
20 into so called macro blocks.

Digitized picture data may be transferred using digital data transfer media, which opens up the applicability to the data transfer using the internet.

25

This possibility leads, coupled with the rapid growth of the internet, to an immense exploration of new ways of shooting, printing and distributing digital images.

30 New users of a digital camera as a new digital medium as well as converts from conventional 35 mm camera market have propelled the digital camera market into extremely high growth.

35 Today's development of digital cameras leads to further improved digital cameras with respect to ever higher resolution cameras. With each increase in resolution, the

amount of necessary storage space is also growing and the management of a huge amount of photos and huge digital photo files are becoming more and more difficult.

- 5 A digital camera according to the state of the art usually stores image information in a Compact Flash Media, a SmartMedia or for example the SonyTM Memory StickTM.

10 These known storage concepts, however, are intended for use as temporary storage media. They are very expensive and they are further limited by their storage capacity.

Furthermore, most users download their pictures into a notebook or a desktop personal computer and rely on them
15 extensively for offline storage and viewing purposes.

[1] discloses a storage medium for digital camera users. The so called IoMega Klik!TM described in [1] is a storage medium which may be inserted directly into a personal computer card
20 slot on a usual laptop or personal computer. IoMega Klik!TM, however, is limited in its applicability, since it is not a portable storage medium, especially since it is not battery-operated. Furthermore, it only includes a USB (Universal Serial Bus) interface as a communication interface to a
25 personal computer. A further communication interface is provided in the storage medium according to [1] as a PCMCIA card providing a 16 bit ATAPI-4.

Furthermore, [2] discloses a storage medium called Digital
30 WalletTM for storing digital information. The Digital WalletTM provides a storage capacity of 6 Gigabytes for storing digital information. Furthermore a USB four pin interface is provided as a communication interface and usually, rechargeable NiMH-batteries are used for running the
35 Digital WalletTM. Furthermore, an LCD (Liquid Crystal Display) screen is provided for presenting stored digital picture information to a user.

However, the Digital WalletTM is a stand-alone device which only can connect to a personal computer, laptop or any computer via the USB communication interface.

5 In order to summarize the defects of the storage media according to the state of the art, there is a huge demand for a portable storage medium providing a wide range of applicability and communication with different kinds of
10 electronic devices having a communication interface of different standards.

SUMMARY OF THE INVENTION

15 Therefore, it is an object of the present invention to provide a portable storage medium for digital picture data providing a wide range of applicability and the possibility to store the digital picture data and to communicate with a
20 large variety of different kinds of electronic devices having a communication interface such as a computer, a television set or other form of display, a printer or even a further storage device.

25 The object is achieved by a portable storage medium for digital picture data comprising a storage unit for storing data and including four communication interfaces.

A first communication interface is adapted to exchange data
30 with the display, for example

- with a television set,
- with a display unit such as a liquid crystal unit, or
- with a TV projection display, for example a video projection display.

35 A second communication interface is adapted to exchange data with a printer, such as an inkjet printer or a laser printer.

Furthermore, the third communication interface is adapted to exchange data with another storage device and a fourth communication interface is adapted to exchange data with a computer, for example a laptop computer, a notebook computer, a personal computer and an iMac computer or a personal digital assistant computer (PDA), in general any device including a data processing unit.

Furthermore, the portable storage medium comprises a first encoding unit being connected to the first communication interface. The first encoding unit is adapted to encoding the stored digital picture data into a first data format which can be processed by the display, the first communication interface may be connected to, so that the encoded digital picture data may be transferred to and presented on the display.

Furthermore, a second encoding unit is provided in the portable storage medium for encoding digital picture data stored in the portable storage medium into a second data format which can be processed by the printer, the portable storage medium may be connected to via a second communication interface, so that the encoded digital picture data may be transferred to and printed by the printer.

With this invention, a very comfortable portable storage medium is provided which can be applied in a scenario with a plurality of strongly varying communication devices and other electronic devices which include a communication interface.

In other words, a one-stop set top box is provided for storing digital picture data with a functionality extending to very different applications.

According to an embodiment of the invention, the third communication interface is adapted to exchange data with a removeable storage device. According to this embodiment of

5

the invention, the third communication interface may be a PCMCIA interface for enabling the communication with and exchanging data with at least one of the following removeable storage devices:

- 5
- a compact Flash Memory Card,
 - a Smart Media Memory Card, and/or
 - a Memory Stick Memory Card.

10 With these embodiments, a communication with a very comfortable further storage device is provided, whereby the management of picture data to be stored is becoming even more flexible with respect to the state of the art.

15 According to a further embodiment of the invention, the fourth communication interface is adapted to exchange data with at least one of the following computer devices:

- a personal computer,
- a laptop computer,
- a notebook computer, and/or
- 20 • a personal digital assistant computer.

According to this embodiment of the invention, the fourth communication interface may be a USB communication interface.

25 The USB communication interface provides a standardized and therefore easy and cheap possibility to communicate with any kind of computer which is usually provided with a USB interface.

30 The storage unit may comprise at least a first storage device for storing data. The first storage device may be a hard disk drive.

35 According to a further embodiment of the invention, the storage unit further comprises a second storage device for storing programming code, wherein the second storage device may be a Flash RAM.

In general, the invention may be seen in a one-stop set top box with a functionality extending to the internet for digital camera users. The invention may also be used as a
5 PowerPoint presentation tool, in general as a presentation tool for graphical data, i.e. the digital picture data. A further functionality according to the invention is the functionality of an external hard disk backup device.

10 A further embodiment of the invention is characterized by the connectivity to the internet via a broadband network (Wide Area Network, WAN) and by the connectivity to other peripheral devices, that is devices such as a CD-Read/Write device, a magneto-optical drive, etc.

15 According to a further embodiment of the invention, the portable storage medium may include a graphical display, for example an LCD display for presenting the stored digital picture data directly on the screen of the storage medium.

20 According to this embodiment of the invention, a digital photo album is provided with a great flexibility and high degree of convenience in using the storage medium.

25 The portable storage medium may be connected to a conventional television display and further may be operated conveniently by a remote controller, preferably by an infrared remote controller via an infrared communication interface.

30 Using the second communication interface, the storage medium can directly print images to a printer and, if required, it may also connect to a personal computer or any other kind of computer via the fourth communication interface.

35

SHORT DESCRIPTION OF THE DRAWINGS

Figure 1 shows a block diagram of the internal structure of a portable storage medium according to the preferred embodiment of the invention; and

Figure 2 shows the portable storage medium according to the preferred embodiment of the invention being connected to a plurality of different peripheral devices such as a television set, a printer, a remote controller, etc.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT OF THE
INVENTION

A preferred embodiment of the invention will now be described with reference to the accompanying drawings.

Fig.2 shows a portable storage medium 200 for storing digital picture data according to the preferred embodiment of the invention.

The portable storage medium 200 comprises a housing 201 which houses a 2.5-inch hard disk. The housing 201 is a profiled casing with about 145 x 82 x 25 mm in size. As will further be described in detail, the housing 201 receives a built-in lithium ion battery used as a power source for running the respective units of the portable storage medium 200.

A 3.5-cm black and white or colour LCD screen 202 is also integrated in the housing 201 of the portable storage medium 200. In this context, it should be mentioned that the LCD screen 202, generally, the display, is optional.

The portable storage medium 200 is usually inserted in a powered docking unit 203, which connects to the portable storage medium 200.

- 5 The docking unit 203 is adapted for a further connection to a television set 210 via a television connection 211. With this television connectivity it is possible to view digital picture data which is stored in the portable storage medium, on the television set 210, which functions as a very
10 convenient display.

Furthermore, a mass storage device 220, according to this embodiment of the invention, a CD-ROM Read/Write device or a ZIP-drive is connected to the portable storage medium 200 via
15 a mass storage connection 221.

The mass storage device 220 allows the user of the portable storage medium 200 to play audio CDs, MP3 music plays, VCDs and DVDs. It also facilitates the easy archiving and managing
20 of the picture data files to the recordable CD-ROM and reusable CD-Rom Read/Write devices. The mass storage device 220 may alternatively be a magneto-optical disk having a storage capacity from 500 Megabyte, 1 Gigabyte and even more.

- 25 Via an infrared connection 231, an infrared remote controller 230 is connected to the portable storage medium 200. Using the infrared remote controller 230 as a wireless input device, it is possible to remote control the portable storage medium 200. Alternatively to the remote controller, a
30 keyboard having an infrared communication interface may be used for controlling the portable storage medium.

With the wireless input device 230, an easy input of text for e-mails and internet navigation data is provided.

35

Furthermore, a broadband modem 240 for internet connectivity may be connected via a further described communication

interface for MagixTM or SCVTM MaxOnline Services and a broadband connection 241 to being connected to a broadband network using for example the Transport Control Protocol (TCP) and Internet Protocol (IP).

5

The internet connectivity thus provides a possibility to use a web browser or to use the portable storage medium for managing, i.e. reading or writing electronic mails or transferring photo data, i.e. digital picture data via the internet. The internet connectivity device 240 is connected to the portable storage medium 200 via an internet connection 241.

Via a further communication interface, a printer 250 may be connected using a printer connection 251. The printer 250 being used as an output device, for example an inkjet printer or a laser printer, allows the user of the portable storage medium 200 to print photographs and other relevant documentation being stored in the portable storage medium 200 without the need of a personal computer or any further communication device.

Additionally to the digital picture data, also audio data or text data further describing the stored digital picture data, wherein the representation data (audio data and text data) is assigned to the respective digital picture data, may be stored in and output by the storage medium 200 to loudspeakers 260 via a loudspeaker connection 261, for example using audio information being encoded according to the MPEG2 or MP3 standardized format.

Altogether, the storage medium 200 opens up a new dimension in the area of HomeNet appliances.

Fig.1 shows a block diagram 100 of the internal structure of the portable storage medium 200.

10

The housing of the portable storage medium 200 is symbolized by a dotted line 101 in Fig.1. The storage medium 100 comprises a central processing unit 102.

- 5 The central processing unit 102 is connected to a system bus and via the system bus 103 to the communication interfaces, which will further be described in detail.

Via a PCMCIA driving unit 104, which is connected to the
10 system bus 103, the central processing unit 102 is connected to a PCMCIA connector 105 as a communication interface.

The PCMCIA connector 105, which also may be denoted as a PCMCIA port, is adapted to be coupled with a memory device
15 from a further digital device such as the digital camera, an MP3 player, a cellular phone, a voice recorder, a digital video camera, etc. The further digital device may for example include memory devices as a backup device 106 that can take the form of (but not limited to) the following memory
20 devices:

- Sandisk™ Compact Flash cards Type I and II,
- Toshiba™ SmartMedia™ cards (for example adapted to a voltage of 5.0 Volts and 3.3 Volts),
- Sony™ Memory Sticks™,
- 25 • Panasonic™ Secure Data memory cards™,
- IoMega Klik!™.

The backup device 106, which can be a removeable backup device, may be connected to the PCMCIA connector 105 either
30 directly, if the connector of the backup device fits to the PCMCIA connector 105, or via a PCMCIA card adapter 107, if the connector of the backup device 106 does not fit to the PCMCIA connector 105.

- 35 Furthermore, a power supply 133 is provided which is connected to a power source selector switch 108 which may either be connected to a battery charger 109 and to an

11

external power source or to an inserted lithium ion battery 110, depending on its switch position. The power source selector switch 108 is controlled via a power source selecting unit 111, which is connected to a docking connector 112, which represents either the docking station 203 from Fig.2 or a plurality of different connectors, which all may be implemented directly in the portable storage medium 100.

If the portable storage medium 100, 200 is connected to the docking station 203, the power source selecting unit 111 connects the power supply 133 to the external power supply and the battery, that is a lithium ion battery, is loaded using the external power source, according to this preferred embodiment of the invention using a power adapter 113, which is connected to the docking connector 112. Alternatively, the battery may be a lithium polymer battery.

If the portable storage medium 100, 200 is not connected to the docking station 203, the power source selecting unit 111 connects the power supply 133 to the lithium ion battery 110.

Furthermore, a first memory device, according to the embodiment of the invention an IDE drive 114 (Internal Drive Electronics), which is optionally removeable, is connected to the portable storage medium and is connected to the system bus 103 via an IDE connector 115 and an IDE driver unit 116. The IDE drive 114 is the first memory device that is used to store the data, preferably the digital picture data that is downloaded from the further digital devices. The first memory device 114 consists of a hard disk drive with a usually large storage capacity in the region of about 10 Gigabytes and above and is connected using the IDE interface, which is also denoted as ATAPI (Advanced Technology Attachment Packet Interface). In this context, it should be mentioned that any other mass storage device may be connected to the system bus 103 using a respective corresponding connector for storing the digital data, preferably the digital picture data.

Furthermore, a random access memory (RAM) 117 is provided being connected to the system bus 103, as a second, according to this embodiment an internal, memory device. The second
5 memory device is used to store reprogramming code, that is software in order to reprogram the data from the digital device to be accessible to the further ancillary devices connected to PB-OS unit. The second internal memory device 117 is contained in a Flash RAM and can itself be
10 reprogrammed and updated from either the memory device connected to the PCMCIA port 105 or from the first memory device 114.

Furthermore, a first encoding unit (not shown) is provided to
15 reprogram data from the first memory device 114 to be displayed on a display unit, for example a television set or an external liquid crystal display via the first communication interface being implemented in the docking connector 112.

20 In other words, there is provided a video output for providing data according to a television encoding standard such as PAL or NTSC, in Fig.1 denoted as a video output 118, which is connected to the docking connector 112.

25 Via the docking connector 112, the portable storage medium 100 may be connected to an external LCD 119.

Alternatively or additionally, the portable storage medium
30 100 may comprise an LCD panel 120 itself, which LCD panel 120 is connected to the system bus 103 via an LCD driver unit 121.

Furthermore, an infrared communication interface 122 is
35 connected to the system bus 103, which communication interface 122 is adapted to receive infrared remote controlling signals from a remote controlling unit such as a

13

remote controller or an external keyboard device having an infrared communication interface.

Furthermore, a keypad 123 is connected to the system bus 103,
5 wherein the keypad comprises a plurality of keys for controlling the portable storage medium 100.

A video driving unit 124 is connected to the system bus 103,
via which video driving unit 123 and the docking connector
10 112, an external device may be connected to the portable storage medium 100 for exchanging video encoded data, for example MPEG 1, MPEG 2 or MPEG 4 encoded video data.

A second encoding unit (not shown) is provided, which second
15 encoding unit is adapted to encode data stored in the first memory device 114 in order to be output and printed to a second communication interface via a printer driver 125, which may either be integrated in the portable storage medium 100 or may be an external driving unit, which is connected to
20 the housing 101 of the portable storage medium 100 via the docking connector 112.

Furthermore, an Ethernet driving unit 126, in general a local area network driving unit is connected to the system bus 103
25 and to the docking connector 112 via which Ethernet driving unit 126, an Ethernet port 127 and a local area network (not shown) may be connected to the portable storage medium 100.

Via a USB driving unit 128, which is connected to the system
30 bus 103 and to the docking connector 112, different external devices may be connected to the portable storage medium 100, such as an alternative backup device 129, 134 which may be removeable, or an alternative modem device 130. The USB communication interface may be implemented according to the
35 USB standards 1.0, 1.1, or 2.0, in Fig.1 symbolized by a box 131, which is connected to the docking connector 112.

14

A third memory device, which, according to this preferred embodiment of the invention, is a partition of the first memory device 114, is adapted to store extended reprogramming code, i.e. software. The extended reprogramming code is used for the requirement to constantly upgrade and support new digital printing devices introduced into the market. Using this extended reprogramming code it is now possible to upgrade the portable storage medium 100 in accordance with the further development of new peripheral devices.

10

According to this embodiment, the third memory device is thus implemented within the first memory device 114 and resides in a hidden partition of the first memory device 114.

15 The extended reprogramming code is generally used to add more functionality, upgrade programming code and add new printer driver software.

The reprogramming sequence is accomplished by a sequence of algorithm that is able to:

- Create the third memory device hidden partition if it does not as yet exist,
- Take raw reprogramming codes stored in the first memory device 114;
- 25 • Delete the current code residing in the third memory device 114 if any are found to exist;
- Decode and reprogram the code in the third memory device 114; and
- Check and verify for data integrity.

30

In the following, the reprogramming sequence will be described in more detail.

Basically there are three entities involved in the software portion, i.e. the reprogramming sequence of the portable storage medium:

35

15

- a) A 1 MB Flash RAM 140 , also being connected to the system bus 103,
- b) The 32 MB SDRAM 117 (Synchronised Dynamic Random Access Memory),
- 5 c) The hidden partition in the hard disk drive 114.

When the portable storage medium 100 is first switched on, the CPU 102 accesses the initialisation code stored in the Flash RAM 140. The initialisation code then tells the CPU 102
10 to power on the circuitry to the hard disk drive 114, video, etc.

A part of the operating system software kernel is then loaded into the 32MB SDRAM 117. Once the hard disk drive
15 114 is powered on and running correctly, the CPU 102 then loads the second portion of the code stored in the hidden partition of the hard disk drive 114 and passes this operating code to the 32MB SDRAM 117 working space. This portion of the code contains amongst other things, support of
20 the various photo-quality inkjet printers and the graphical user interface (GUI).

The Flash RAM 140 is a non-volatile RAM (i.e. it does not lose its programming code even if there is no power to keep
25 the code stored in the Flash RAM 140.)

The 32MB SDRAM 117 is a volatile RAM.

The hidden partition is stored in the hard disk and can only
30 be accessed when the hard disk drive 114 is powered on and running.

The reprogramming sequence is then two-fold.

35 It involves the step of reprogramming of the Flash RAM 140 and the printer code stored in the hidden partition of the hard disk drive 114.

The reprogramming of the Flash RAM 140 comprises the following steps:

- 5 a) Using a pre-set "secret key combination 1" sequence of button key presses, the reprogramming sequence is invoked.
- b) The first thing the reprogramming code does is to check for a pre-defined arbitrary file that the user has loaded into the hard disk partition (but not the hidden partition) or in the Memory Card via the PCMCIA slot.
- 10 c) If the pre-defined file does not exist, the reprogramming sequence is aborted.
- d) If the pre-defined file exists, the reprogramming code then makes use of this file to reprogramming the Flash RAM 140.

15

The reprogramming of the printer drivers and the GUI in the hidden partition of the hard disk drive 114 can be accomplished in two ways according to the preferred embodiment of the invention:

- 20 a) Connecting the portable storage medium 100 to the USB port, and running a software program to access the code in the hidden partition of the hard disk drive 114 and then updating it. If it does not find the hidden partition of the hard disk drive 114, the reprogramming sequence will
- 25 terminate.
- b) Connecting a Memory card via the PCMCIA slot to the portable storage medium 100 and then invoking the pre-set "secret key combination 1". If it finds the reprogramming code in this memory device, it will then copy these files
- 30 over to the hidden partition of the hard disk drive 114. If it does not find the hidden partition, the reprogramming code will stop at this stage.

In this context it should be noted that the pre-set "secret
35 key combination 1" key press sequence is preferably the same one for the reprogramming of the Flash RAM 140 and for the

17

reprogramming of the printer drivers and the GUI. This is done so as to achieve the following:

- a) Only one secret combination key press is needed
 - b) This option is needed in case the user does not have
- 5 access to the PC.

The following steps are executed in answer to the pressing of the "secret key combination 1":

- 10 • It is determined whether a hidden partition exists in the hard disk drive 114.
- If a hidden partition does not exist in the hard disk drive 114, a new hidden partition is created in the hard disk drive 114.
- 15 • It is checked for reprogramming code for the hidden partition, i.e. the new GUI codes or the New printer driver codes.
- If the code(s) is/are found in either the hard disk drive 114 (but not in the hidden partition) or the memory card in the PCMCIA slot, the code is read in, the
- 20 old code in the hidden partitions deleted and the new code is copied in the hard disk drive 114.
- If the code(s) is/are found, i.e. If the GUI or printer driver code is/are not found, the reprogramming sequence moves on to the next step.
- 25 • It is checked for the reprogramming code for the Flash RAM 140 in the hard disk partition (but not the hidden partition) or in the Memory Card via the PCMCIA slot.
- If the reprogramming code is found in the devices, it will then use this new code to over-write the stored
- 30 content of the Flash RAM 140.
- If the reprogramming code is not found in the devices, i.e. if the files are not found in the devices, the reprogramming code will stop at this stage.

- 35 Furthermore, a firewire connector 135 is provided which is connected to the system bus 103 via a firewire driving unit 136. The backup device 106 may be connected to the portable

storage medium 100 via the firewire connector 135 or the
PCMCIA connector 105. Alternatively, any other device having
a Firewire communication interface, for example a further
printer device, may be connected to the firewire connector
5 135.

A third communication interface being implemented in the
docking connector 112 is adapted to transfer data stored in
the first memory device 114 to other storage media such as a
10 CD recordable and CD rewriteable mass storage device or a
magneto-optical disk.

A fourth communication interface, for example the firewire
connector 129 or a communication interface being implemented
15 in the docking connector 112 is adapted to communicate data
stored in the first memory device 114 to a personal computer,
a notebook computer, a laptop computer or any further
electrical device including a processing unit and a storage
unit.

20

The communication may use the communication protocols
according to for example:

- USB versions 1.0, 1.1 and 2.0,
- Firewire, that is the IEEE standard 1394 or Sony™
25 I-link™,
- the internet standard,
- the Universal Asynchronous Receiver Transmitter 138
(UART) such as a modem, for example a dial-up and broad
band modem 131, being connected to the system bus 103
30 via a UART driving unit 137.

A third encoding unit is provided to encode digital audio
data to a fifth communication interface being implemented in
the docking connector 112, which is for example connected via
35 an audio driving unit 132 so as to be able to play audio
files to an external speaker unit, such as the loudspeakers
260.

A further connector 139 is provided for future expansion devices.

- 5 In summary, the invention is used to encode the data that is downloaded and stored in the first memory device 114 to be:
- Viewed on the visual display unit such as the television set;
 - Output onto a printing device, that is the printer, such
10 as an inkjet photo quality printer;
 - Restored into another storage device such as a CD-recordable or rewriteable device,;
 - Converted to audio to be output on external set of
15 speakers or headphones, transferred to another computing device via a modem (UART device); and
 - Transferred to another computing device via an internet interface.

It should be mentioned that the invention is not limited to
20 storing still digital picture data, but is also capable of storing, viewing and playing of almost any kind of multimedia data such as VCD data, DVD data and MP3, or any other kind of audio encoded data.

The following publications are cited in this document:

- [1] Obtainable via the internet under the URL-address on
January 21, 2001:

5

[http://www.iomega.com/europe/productoverviews/clik/
index.HTML](http://www.iomega.com/europe/productoverviews/clik/index.HTML)

- [2] Obtainable via the internet under the URL-address on
January 21, 2001:

10

<http://www.mindsatwork.net/products/factssheet.htm>

CLAIMS

What is claimed is:

- 5 1. A portable storage medium for digital picture data comprising
- a storage unit for storing data,
 - a first communication interface being adapted to exchange data with a display,
 - 10 • a first encoding unit for encoding stored digital picture data in a first data format which can be processed by the display,
 - a second communication interface being adapted to exchange data with a printer,
 - 15 • a second encoding unit for encoding stored digital picture data in a second data format which can be processed by the printer,
 - a third communication interface being adapted to exchange data with another storage device, and
 - 20 • a fourth communication interface being adapted to exchange data with a computer.
2. A portable storage medium for digital picture data according to claim 1,
- 25 wherein the third communication interface is adapted to exchange data with the removeable storage device.
3. A portable storage medium for digital picture data according to claim 1 or 2,
- 30 wherein the third communication interface is a PCMCIA interface.
4. A portable storage medium for digital picture data according to any of the claims 1 to 3,
- 35 wherein the third communication interface is adapted to exchange data with at least one of the following removeable storage devices:

- a compact Flash Memory Card,
 - a Smart Media Memory Card, and/or
 - a Memory Stick Memory Card.
- 5 5. A portable storage medium for digital picture data according to any of the claims 1 to 4, wherein the fourth communication interface is adapted to exchange data with at least one of the following computer devices:
- 10 • a personal computer,
• a laptop computer,
• a notebook computer, and/or
• a personal digital assistant computer.
- 15 6. A portable storage medium for digital picture data according to claim 5, wherein the fourth communication interface is a USB interface.
- 20 7. A portable storage medium for digital picture data according to any of the claims 1 to 6, wherein the storage unit comprises at least the first storage device for storing data, wherein the first storage device is a hard disk drive.
- 25 8. A portable storage medium for digital picture data according to any of the claims 1 to 7, wherein the storage unit further comprises a second storage device for storing programming code.
- 30 9. A portable storage medium for digital picture data according to any of the claims 1 to 8, wherein the second storage device is a Flash RAM.
- 35 10. A portable storage medium for digital picture data according to any of the claims 1 to 9,

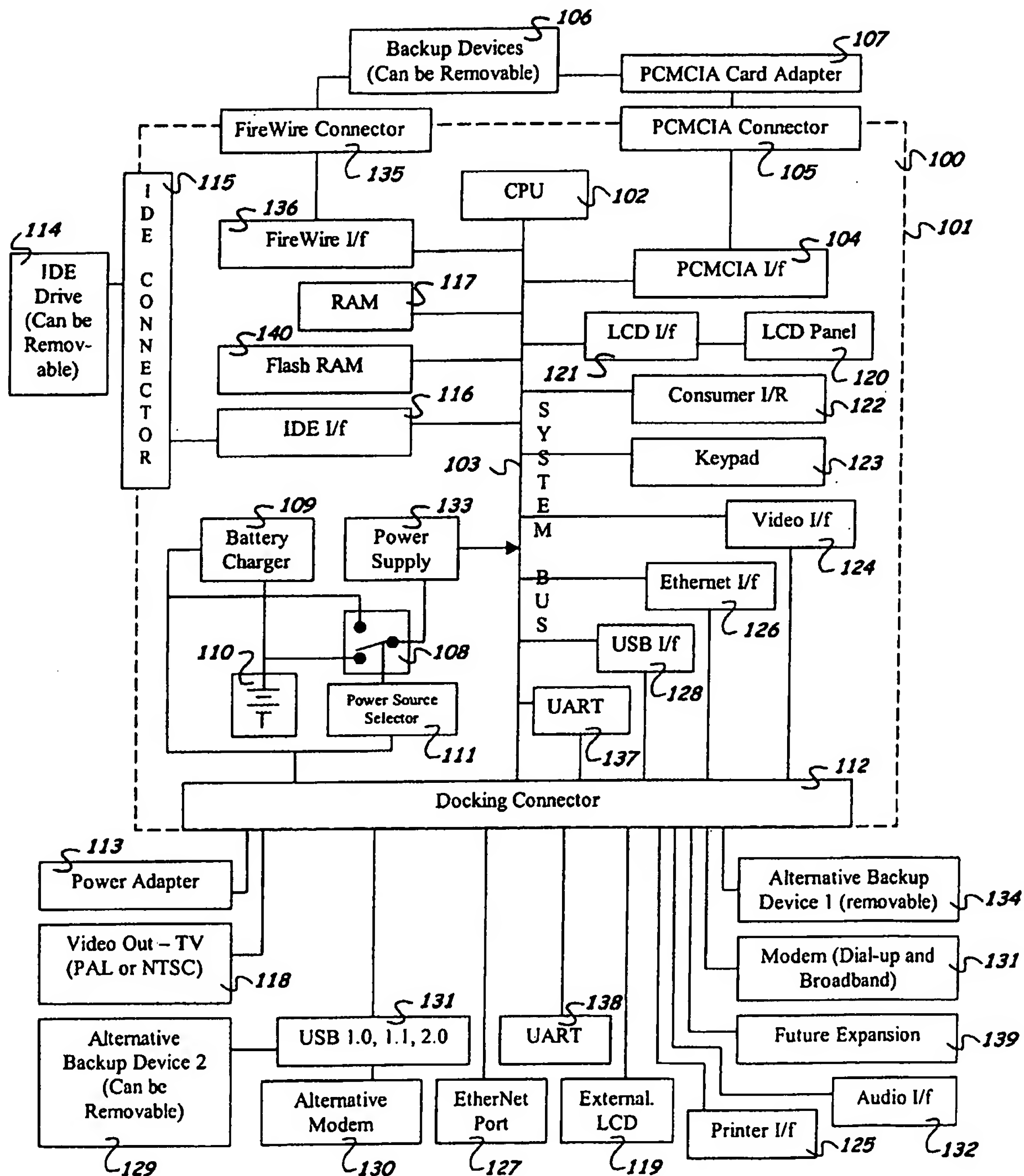
23

further comprising a display unit integrated in the housing of the portable storage medium.

11. A portable storage medium for digital picture data
5 according to claim 10,
wherein the display unit is an LCD unit.

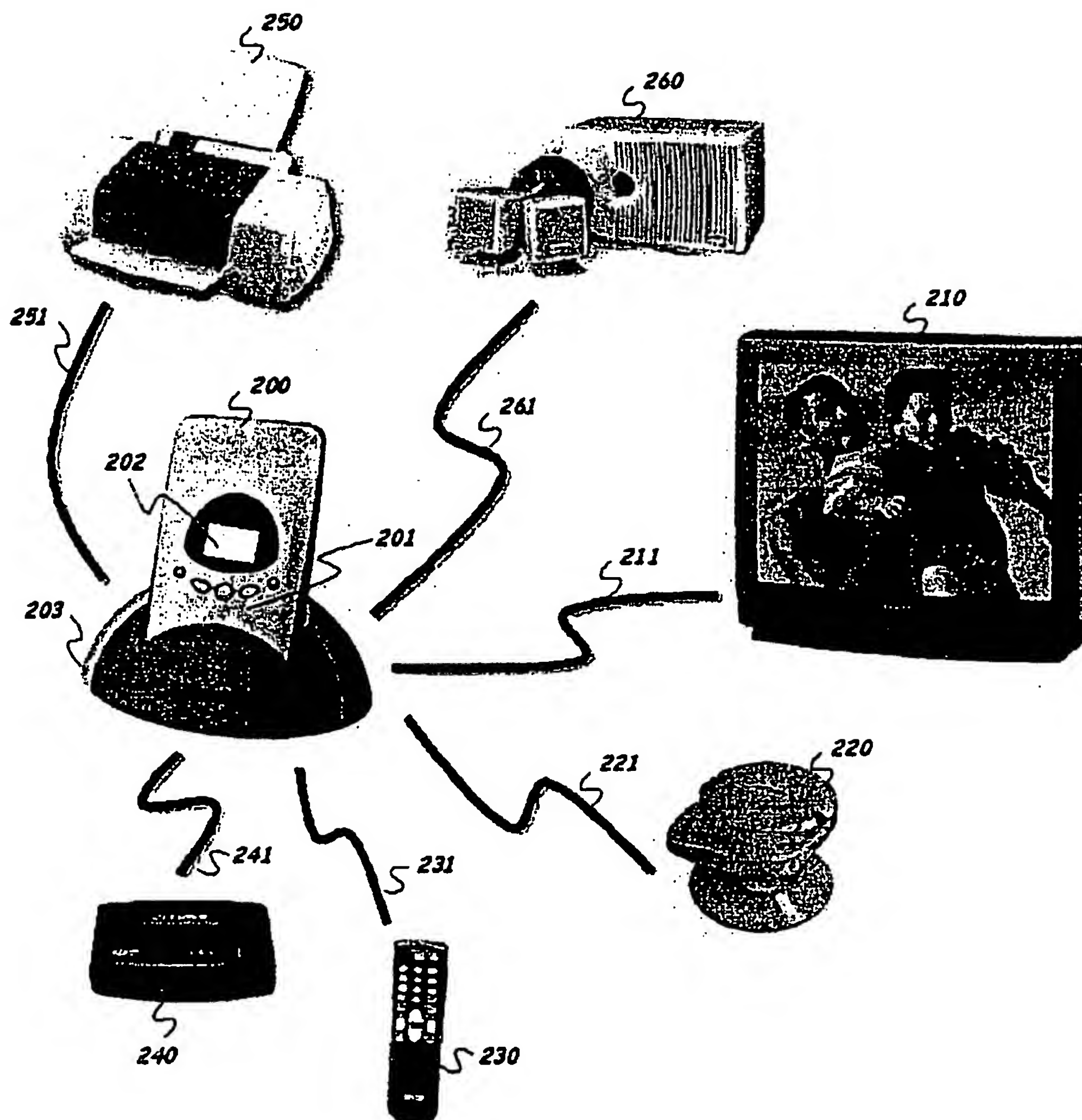
1/2

FIG. 1



2/2

FIG. 2



INTERNATIONAL SEARCH REPORT

International Application No
PCT/JP 01/00034

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 G06F1/16

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

WPI Data, INSPEC, EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 941 965 A (MOROZ JOHN A ET AL) 24 August 1999 (1999-08-24)	1-4
A	column 1, line 13 -column 3, line 32 column 3, line 11 -column 4, line 35 claims 1-3; figures 1,2 ---	5-11
A	WO 96 35152 A (ELONEX TECHNOLOGIES INC) 7 November 1996 (1996-11-07) the whole document ---	1-11
A	US 5 680 334 A (DANIELSON ARVIN D ET AL) 21 October 1997 (1997-10-21) the whole document -----	1-11

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *&* document member of the same patent family

Date of the actual completion of the international search

13 December 2001

Date of mailing of the international search report

21/12/2001

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Nguyen Xuan Hiep, C

INTERNATIONAL SEARCH REPORT

onal Application No

US, SG 01/00034

Patent document cited in search report		Publication date		Patent family member(s)	Publication date
US 5941965	A	24-08-1999	US	6256691 B1	03-07-2001
WO 9635152	A	07-11-1996	WO	9635152 A1	07-11-1996
US 5680334	A	21-10-1997	CA	2158494 A1	17-03-1996
			CA	2158589 A1	19-03-1996
			CA	2158590 A1	20-03-1996
			US	6144976 A	07-11-2000
			US	6266685 B1	24-07-2001
			US	5805474 A	08-09-1998
			US	5710728 A	20-01-1998
			US	6049813 A	11-04-2000
			AU	694418 B2	23-07-1998
			AU	6272794 A	14-09-1994
			AU	7315498 A	27-08-1998
			CA	2157039 A1	01-09-1994
			EP	0686279 A1	13-12-1995
			WO	9419736 A1	01-09-1994
			US	5488575 A	30-01-1996
			US	5617343 A	01-04-1997
			US	5850358 A	15-12-1998
			US	5331580 A	19-07-1994
			US	5625555 A	29-04-1997
			US	5872354 A	16-02-1999
			US	5834753 A	10-11-1998
			US	5694318 A	02-12-1997
			US	5790536 A	04-08-1998
			US	5726984 A	10-03-1998
			US	5180232 A	19-01-1993
			US	5949056 A	07-09-1999
			US	5914481 A	22-06-1999
			US	5465207 A	07-11-1995
			US	5457629 A	10-10-1995
			US	5928292 A	27-07-1999
			US	5895431 A	20-04-1999